AMENDMENTS

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for I/Q mismatch calibration in a receiver having an I/Q correction module using parameters A_p and B_p, the method comprising the steps of:

generating an analog test signal $x(t)$ containing $\cos(2\pi(f_c + f_T)t)$, where f_c and f_T are predetermined real numbers;

applying I/Q demodulation to reduce the central frequency of the signal $x(t)$ by f_c Hz and outputting a demodulated signal $x_{dem}(t)$;

converting the analog signal $x_{dem}(t)$ to a digital signal $x_{dem}[n]$ with a preset sampling rate of f_s Hz;

sending the signal $x_{dem}[n]$ into the I/Q correction module using parameters A_p and B_p and outputting a corrected signal $w[n]$;

obtaining two measures U_1 and U_2 of the corrected signal $w[n]$ where U_1 and U_2 are values indicative of the discrete-Fourier transform of $w[n]$ corresponding to frequency $+f_T$ Hz and $-f_T$ Hz, respectively; and

updating the parameters A_p and B_p of the I/Q correction module respectively by a first and second function of the two measures U_1 and U_2, and the current values of the parameters A_p and B_p; wherein the initial values of A_p and B_p are nonzero numbers.

2. (Original) The method as claimed in claim 1, wherein the I/Q correction module implements a function:

$$w[n] = A_p \cdot x_{dem}[n] + B_p \cdot x^*_{dem}[n],$$

where the superscript * refers to a complex conjugate.

3. (Original) The method as claimed in claim 1, wherein the first and second function are respectively:

$$A'_p = A_p - \mu \cdot B^*_p \cdot U_1 \cdot U_2; \text{ and}$$

$$B'_p = B_p - \mu \cdot A^*_p \cdot U_1 \cdot U_2,$$

where A'_p and B'_p are the updated values, A_p and B_p are the current values, and μ is a preset step size parameter.

4. (Original) The method as claimed in claim 1, wherein:

$$f_T = \frac{K}{M} f_s,$$

where K and M are integers and the measures U_1 and U_2 are respectively obtained by:

$$U_1 = \frac{1}{M} \sum_{n=0}^{M-1} w[n] \cdot e^{-j2\pi \frac{K}{M} n}; \text{ and}$$

$$U_2 = \frac{1}{M} \sum_{n=0}^{M} w[n] \cdot e^{j2\pi \frac{K}{M} n}.$$

5. (Original) The method as claimed in claim 1 further comprising the step of:

normalizing the updated parameters A_p and B_p so that the power of the corrected signal $w[n]$ is the same as that of the digital signal $x_{dem}[n]$.

6. (Currently Amended) An apparatus for I/Q mismatch calibration of a receiver, comprising:

a signal generator generating an analog test signal $x(t)$ containing $\cos(2\pi(f_c + f_T)t)$, where f_c and f_T are predetermined real numbers;

a demodulator applying I/Q demodulation to reduce the central frequency of the signal $x(t)$ by f_c Hz and outputting a demodulated signal $x_{dem}(t)$;

A/D converters converting the analog signal $x_{dem}(t)$ to a digital signal $x_{dem}[n]$ with a preset sampling rate of f_s Hz;

an I/Q correction module using parameters A_p and B_p to compensate I/Q mismatch in the signal $x_{dem}[n]$ and outputting a corrected signal $w[n]$;

a dual-tone correlator outputting two measures U_1 and U_2 of the corrected signal $w[n]$ where U_1 and U_2 are values indicative of the discrete-Fourier transform of $w[n]$ corresponding to frequency $+f_T$ Hz and $-f_T$ Hz, respectively; and

a processor implementing the step of:

providing the parameters A_P and B_P with nonzero initial values; and

updating the parameters A_p and B_p ~~of the I/Q correction module~~ respectively by a first and second function of the two measures U_1 and U_2, and the current values of the parameters A_p and B_p.

7. (Original) The apparatus as claimed in claim 6, wherein the processor further implements the step of:

normalizing the updated parameters A_p and B_p so that the power of the corrected signal $w[n]$ is the same as that of the digital signal $x_{dem}[n]$.

8. (Original) The apparatus as claimed in claim 6, wherein the first and second function are respectively:

$A_p^{'} = A_p - \mu \cdot B_p^{*} \cdot U_1 \cdot U_2$; and

$B_p^{'} = B_p - \mu \cdot A_p^{*} \cdot U_1 \cdot U_2$,

where $A_p^{'}$ and $B_p^{'}$ are the updated values, A_p and B_p are the current values, and μ is a preset step size parameter.

9. (Original) The apparatus as claimed in claim 6, wherein the I/Q correction module implements a function:

$w[n] = A_p \cdot x_{dem}[n] + B_p \cdot x_{dem}^{*}[n]$,

where the superscript * refers to a complex conjugate.

10. (Original) The apparatus as claimed in claim 6, wherein :

$f_T = \frac{K}{M} f_s$,

where K and M are integers and the measures U_1 and U_2 are respectively obtained by:

$U_1 = \frac{1}{M} \sum_{n=0}^{M-1} w[n] \cdot e^{-j2\pi \frac{K}{M} n}$; and

$$U_2 = \frac{1}{M} \sum_{n=0}^{M} w[n] \cdot e^{j 2\pi \frac{K}{M} n} .$$